

EQUIVALENTS AND FORMULAS

EQUIVALENTS

1 acre = 43,560 square feet

1 cubic foot of water = 7.48 gallons

1 gallon of water = 8.34 pounds

1 day = 1,440 minutes = 86,400 seconds

1 million gallons/day = 694 gallons/minute = 1.547 cubic feet/second = 3.069 acre-feet/day

1% = 10,000 mg/L

$\pi = 3.14$

1 inch of mercury = 1.133 feet of water

1 pound/square inch = 2.31 feet of water

1 HP = 0.746 Kw = 550 ft-lb/sec = 33,000 ft-lb/min

FORMULAS

Area of rectangle = Length x Width

Area of circle = $\frac{\pi}{4} \times \text{Diameter}^2 = 0.785 \times \text{Diameter}^2$

Volume of rectangular or circular tank with uniform depth = Area x Depth

Volume of cone = $\frac{1}{3} \times \text{Base Area} \times \text{Depth}$

Circumference = $\pi \times \text{Diameter}$

Velocity = $\frac{\text{Distance}}{\text{Time}}$

Flow = Velocity x Area

Detention time = $\frac{\text{Volume}}{\text{Flow}}$

Pounds/day = 8.34 x Flow, mgd x Concentration, mg/L

F/M = $\frac{\text{Pounds of BOD or COD applied per day}}{\text{Pounds of MLVSS under aeration}}$

MCRT = $\frac{\text{Pounds of MLSS in secondary system (aeration tank + clarifier)}}{\text{Pounds of MLSS leaving secondary system per day (effluent + WAS)}}$

Water HP = $\frac{\text{Flow, gpm} \times \text{Total Head, ft}}{3960 \frac{\text{gpm} \cdot \text{ft}}{\text{HP}}}$

Brake HP = Power to electric motor x Motor efficiency

Volatile Solids Reduction, % = $\frac{\text{In} - \text{Out}}{\text{In} - (\text{In} \times \text{Out})} 100\%$